CORRESPONDENCE

SIR,

Nominal Horsepower

Referring to Lieutenant-Commander Tomlin's article in the June, 1969 *Journal*, it may be of interest to note that one use of Nominal Horsepower provides an example of an early attempt at standardization as it would appear that in some large centres of marine engineering, engine makers adhered to standard sizes of cylinders for various values of Nominal Horsepower.

The continuing use of the expression after it had ceased to have any practical engineering value was indeed mainly because it conveyed a measure of the size and commercial value of an engine, and for this reason it was used by Lloyd's Register for the purpose of levying Survey and Registration fees until the early part of the present century.

The Admiralty formula was not suitable for Lloyd's Register use, however, because although it made allowances for increases in piston speed, it did not allow for the higher boiler pressures that developed during the 19th Century. Lloyd's Register made allowance for boiler power by using the following expression:

$$\text{Lloyd's NHP} = P \times \mathfrak{z}\,\frac{D^2\sqrt{S}}{100} + \frac{H}{X}$$

where: P = Boiler pressure in lb/sq in.

D = Diameter of LP piston in inches

S = Stroke of engine in inches

H = Boiler heating surface in square feet

X = 15 for natural draught boilers and
12 for forced or induced draught boilers

$\mathfrak{z}$ = 0·34 when boiler pressure is under 160 lb/sq in. and
0·393 when 160 lb/sq in. or higher.

Finally, a Manual of Marine Engineering of about 100 years ago when commenting on the introduction of the term Nominal Horsepower states the reason as being 'to enable the power of an engine to be expressed without using such high numbers of foot pounds as to place it beyond the grasp of ordinary minds'. How much more difficult is the task of the ordinary mind of today when faced with data concerning sub-atomic particles on the one hand and concepts such as that of an expanding universe on the other.

(*Sgd.*) R. CRAWLEY,
Lieutenant-Commander, *R.N.* (*Rtd.*)

Sɪʀ,

Marine Engineering Department Employment—H.M.S. 'Fife'

I have studied with considerable interest an advance copy of Commander Deacon's article 'Marine Engineering Department Employment—H.M.S. *Fife* (see p. 397). The extent of the agreement with the results from H.M.S. *London* is very encouraging.

Unfortunately the graph of maintenance opportunity for H.M.S. *London* contained in 'A Data Collection Experiment—Employment Information' (Vol. 18, No. 1) was based on an earlier version of the plotting method than that for H.M.S. *Fife*, so they are not strictly comparable. In terms of the minimum for *London*, however, the difference is not great, some 9 per cent, giving a minimum of −165.

Deacon's conclusions 5 and 6 refer to distinct differences between the *Fife* and *London* results. It seems to me that these may be partly attributable to the fact that *Fife* was in her first commission and *London* in her second. As a consequence, those parts of *London's* plant which were not worked upon during the intervening refit were older and may therefore have been showing time dependent deterioration and hence a higher defect rate. This may go some way to explain the apparent implication that the maintenance which *London* had received had been substantially less effective than that of *Fife*, judged from the respective maintenance opportunity plots.

It is also evident from the exploration of *London*'s equipment data, described elsewhere in this *Journal*, that the range of skilled defect/maintenance ratio to be expected with varying usage is wider than it appeared to be at first sight. The degree of disagreement underlying conclusion 5 is much reduced thereby.

(*Sgd.*) A. O. F. Vᴇɴᴛᴏɴ,
Commander, R.N.

Sɪʀ,

We Never Learn

May I be allowed to comment on the 'Notes from Sea' appearing in Vol. 18, No. 2 of the *Journal of Naval Engineering*. One note is headed 'We Never Learn' and I fear that this is so true as to be quite discouraging, even at the end of 30 years' 'E' time.

Have we not had time to learn:

(*a*) Of the dangers of mixing salt water and non-watertight motors.

(*b*) Not to tolerate people who do not recognize loose holding down bolts of plummer blocks, or whose boilers cannot be blown down safely.

(*c*) To design adjacent oil and fuel connections so that they cannot be reversed.

(*d*) That if there is a need to transfer fuels, arrangements should be made to do it.

(*e*) That international co-operation calls for international fuel connections.

(*f*) That feed pump bearings sometimes (since 1942 to my knowledge) need external cooling.

(*g*) That boiler compound contamination of feed water is easily distinguished with a couple of drops of phenol phthalein.

(*h*) That some evaporator baffles need close checking on assembly (reported 1947).

These notes seem, to me, to imply a sad lack of professionalism in many fields.

(*Sgd.*) R. D. Cooper,
Commander, R.N.

Sir,

Y.69

Reference is made to the interesting article, 'M.C.M., Survey and Auxiliary Vessels', by Commander Tennent (Vol. 18, No. 2), and in particular to the section headed 'Forced Lubrication System'.

Having been associated with the preparation of the original specification for the forced lubrication systems for the RFAs *Resource* and *Regent*, one may be permitted to add a few detailed comments of one's own from which, in Commander Tennent's words, some lessons can be learned.

While Fig. 1 of the article shows the system originally fitted in the ship, it is not the system originally specified. Two important differences are that in the specified system:

(*i*) Controllable orifices were included in every distribution line,

(*ii*) The oil supply to the HP turbines was taken off before the ring main.

Rectifying these departures from the specified arrangement constituted a large part of the modifications which were ultimately carried out. Had they been incorporated in the first place, it is possible that the basic difficulty of increasing the HP turbine inlet pressure would not have arisen.

In the last part of the section under discussion, it is stated that while the above modifications improved the oil pressure to the turbines, the general pressure level everywhere was still only marginal. That this view should prevail is not surprising probably because the gearing local gauge board was not mounted on top of the gearing or even on a similar level, as would be expected, but at a height of between 18 and 20 feet above the centre-line of the main engines. In consequence, all the pressure gauges for both turbines and gearing had a static head error of about minus 6·5 psi, without any indication on any of the gauges to show that their readings were low by this amount.

During a visit to the ship while Basin Trials were in progress, the opportunity was taken to record some pressure readings. With the 'original system' in use, the main shaft running at 25 rpm, an oil temperature of 113 degrees F and one MD pump running, the lowest pressure recorded at the gearing was 8·5 psig at the main wheel forward bearing (corrected for static head). The lowest pressure anywhere in the system was 6 psig at the HP turbine forward bearing.

In the light of these readings and bearing in mind:

(*i*) The relatively low speed of the main shaft at which they were taken;

(*ii*) The increase in system pressure that will occur in the original system as soon as the shaft speed increases beyond 50 per cent;

(*iii*) The design inlet pressure for full-power operation is normally 10 psig;

(*iv*) The increase (*ii*) can be confidently expected to raise the inlet at full power above the 10 psig mentioned in (*iii*);

it is evident that the term 'marginal pressure' requires some qualification. For example, during low-pressure trials carried out while shore testing the GM destroyer machinery, the gearing was operated at full power on an inlet pressure below 3 psig without damage.

Regarding the reason given for fitting a gravity system, it should be mentioned that:

(*i*) A gravity system was considered while writing the specification but was rejected because of the fire hazard. The direct feed system ultimately specified in lieu of the gravity system was approved by Lloyds.

(*ii*) During a complete electrical failure, only the motor-driven pumps are rendered inoperative. The shaft-driven pump continues to supply oil as long as the main shaft is turning. The fact that no bearing failures are reported in Commander Tennent's article prompts one to assume that the shaft-driven pump fulfilled one of its functions which was to supply oil to the machinery in just such a contingency.

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